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DINOTOCRINUS, A NEW FOSSIL INADUNATE CRINOID GENUS

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The new crinoid genus here described comes from the lower Chester group of Alabama and the Chester of Illinois (Mississippian). It is distinctive but has a limited known geographic and stratigraphic range. One new species and two described species are referred to the genus.

DINOTOCRINUS, new genus

Genotype.—Dinotocrinus compactus, new species.

Generic diagnosis.—

Crown. Compact, subcylindrical, expanding slightly to about one-half its height, then contracting slightly. Ratio of dorsal cup to height of crown about 1:10.

Dorsal cup. Cyathiform, with sharply truncated base.

IBB. Small, fused into a flat, pentagonal plate entirely contained within the basal depression.

BB. Large, forming the base of the cup as seen in side view.

RR. Wider than high, large. Facet full width of R, linear. Suture slightly gaping.

IBr. One in each ray. Variable in height; those in r and 1 post and ant RR tending to be higher than those in r and 1 ant RR. Upper sloping faces of IAx long.

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Arms. Relatively short and stout. Typically one isotomous division above the main dichotom. In one half-ray in one specimen there is an additional division giving an endotomous structure. One assumes that in later, at present unknown, species of the genus endotomy would obtain. The first division above the dichotom is high up, with an average of about 10 IIBr. An occasional half-ray as in the l post R of the holotype has the division at a considerably higher point. The Br are high and have slightly sloping faces. The pinnules are relatively long and stout.

Post IR. RA large, entering fairly deeply between post and r post BB. X smaller, extending well above radial facet. X meets post B on a narrow face. RT slightly smaller than anal X, the greater part of the plate extending above the radial facet. Contact of RT and r post B narrow.

Ventral sac. Short, slender, reflexed.

Column. Circular in section, with prominent nodals and internodal series.

Characteristic species of the genus.—

Dinotocrinus compactus, new species

"Ste. Genevieve," about 7 miles south of Huntsville, Ala.

For description, see below.

Dinotocrinus roemeri (Troost), new combination

Cyathocrinites roemerii Troost, 1850, p. 61, *nom. nud.*
Cyathocrinites roemerii Troost, 1909, p. 86, pl. 6, fig. 11.

"Carboniferous limestone—vicinity of Huntsville, Alabama." (Gasper?)

Cited as synonym of *Scaphiocrinus huntsvillae* Worthen by Wood, 1909, p. 86.

Dinotocrinus salteri (Worthen), new combination

Poteriocrinus salteri Worthen, 1882, p. 21.
Poteriocrinus salteri Worthen, 1883, p. 291, pl. 29, fig. 18.
Scaphiocrinus salteri Wachsmuth and Springer, 1886, p. 236 (160).

"Chester; Chester, Illinois."

Geologic and geographic distribution.—The genus as yet is known only in the lower Chester of Alabama and the Chester of Illinois.

Relationships.—In its general habit *Dinotocrinus* resembles the European genus *Woodocrinus*. Many American species have hitherto been referred to *Woodocrinus* with little justification. The cyathi-

form cup and depressed base of *Dinotocrinus* at once separate the genus from *Woodocrinus* with its turbinate cup and prominent IBB. *Dinotocrinus* resembles very young *Zeacrinus*, and, although one would not place them in the same family, the probability is that they are nearly related. Although many of the crinoid genera associated with *Dinotocrinus* carry on upward into the prolific crinoid faunas of the higher Chester, neither *Dinotocrinus* nor any form clearly derivative from it has been found so far. *Dinotocrinus* seems nearly related to *Dasciocrinus* and may be ancestral to it.

Remarks.—I have referred *Poteriocrinus salteri* Worthen to *Dinotocrinus*. The figure is poor, and I have not examined the type, but there is a great similarity to young *Dinotocrinus*, and there does not seem to be any other Chester genus to which it is referable. *Agassizocrinus hemisphericus* Worthen may fall here, but well-preserved crowns from the Chester of Illinois with similar dorsal cups do not agree in arm structure. *Cyathocrinites roemeri* Troost is a *Dinotocrinus*. Troost's type is a young specimen in a very poor state of preservation. Wood (1909, p. 86) lists Troost's species as a synonym of *Scaphiocrinus huntsvillae* Worthen. This cannot be. If Worthen's figure can be relied on, his species is quite distinct and probably referable to *Dasciocrinus*. The horizon of *Dinotocrinus roemeri* is uncertain. Judged from the lithology of the matrix, it seems probable that the specimen was collected from the Gasper. This is the horizon from which most of the crinoids were taken in the early days.

DINOTOCRINUS COMPACTUS, new species

PLATE 63

Of this species there are some 35 crowns available for study, the net result of collections made during many field seasons by Carl Rominger, Charles Wachsmuth and his wife, and me. The specimens range in size from 13 to 40 millimeters in height.

With the arms erect the crown is subcylindrical, with closely appressed rami, except in the posterior inter-ray. The crown is notable in the relative shortness and stoutness of the rami.

The dorsal cup is cyathiform, with a sharply truncate base. The ratio of height to breadth is approximately 3:8. The IBB are closely united in a pentagonal plate that extends well beyond the column and lies entirely within the basal depression. The basals are large, tumid, and form the base of the cup as seen in lateral view. The radials are wider than high. The articulating suture is linear and slightly gaping, extending the full width of the radial. The radianal is large, resting below on the post and r post BB and penetrating fairly deeply between them. The contact with the pos-

terior basal is considerably longer than that with the right posterior basal. The radianal extends upward to approximately two-thirds the height of the r post R. Anal X rests on the r post B on a narrow face and contacts r post B on a considerably longer face. Anal X extends upward above the plane of the radial facet. The right tube plate is large, resting on RA on a relatively narrow face, and extends upward above the plane of the radial facet by about two-thirds its height.

There is a single primibrach in each radius. The primaxials are heavy, with long axillary faces. The IAx in the r and l post and ant RR are considerably higher than those in the other rays. The IAx are constricted medially, and there are inconclusive indications that each is composed of two fused primibrachs.

The rami are relatively short and stout. Typically there is but a single isotomous division above the main dichotom. In one specimen in one half-ray there is an additional bifurcation resulting in an endotomous structure. The divisions in the half-rays take place in medium-sized specimens at about the eighth or tenth secundibrach, but exceptionally it may come considerably higher. Owing to the height of the brachials the division is high up, nearly at one-half the height of the arms. The brachials are high, nearly quadrangular in the distal portion of the ramus and with slightly sloping faces proximad. Pinnules are borne on alternate sides by successive brachials. The secundaxils are tumid to subspinous, giving the rami a decided flexure at this level. The terminal rami are divergent at their inception, which, combined with the outward flexure of the IIAx, makes this portion of the arms quite prominent. These characters become more pronounced with age. The pinnules are long and stout.

The ventral sac has been seen in but one individual, a young specimen here figured. The sac is short and slender, apparently having a height of but about one-half that of the arms. It is reflexed, but how far down on the anterior side the reflexed portion extends is not known.

The column is circular in section, with well-defined nodals and internodal series.

Type.—The holotype, S 4401a, and paratypes, S 4401b–f, are in the Springer collection in the United States National Museum.

Horizon and locality.—The species has been found only in the formation known as Ste. Genevieve in the Alabama geological reports. All specimens were collected approximately 7 miles south of Huntsville, Ala.

Relationships.—*Dinotocrinus compactus* may readily be distinguished from *D. roemeri* (Troost) from the same region. In specimens of comparable size the arms of *D. roemeri* are relatively stouter

and shorter, and the second bifurcation is higher up. The dorsal cup of *D. roemeri* is badly preserved, and comparisons are of little value.

Ontogeny.—The dorsal cup in very young specimens is more rotund and the plates less tumid than in the older specimens. The IAx in young individuals, as is usual, are proportionately longer and more slender than in older specimens. The same is also true of the succeeding brachials. In young specimens the number of IIBr is six as a rule, though one half-ray seen had but four. The number of IIBr increases with age, the usual number in the largest specimens being 10 or 12.

There is a slight divergence of the rami resting on the IIx in young and medium-sized specimens. With increasing age the axillary faces of the IIAx tend to form a more acute angle. This throws the bases of the terminal rami still farther apart.

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